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**MARINE MOLLUSCA OF GUADALUPE ISLAND,
MEXICO¹**

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While weathering a storm in the shelter of Guadalupe Island on April 20, 1925, the members of the expedition of the California Academy of Sciences to the Revillagigedo Islands made such use of their time as the conditions would permit. Among other activities some dredging was done in the semi-sheltered cove at the south end of the island. The work was done chiefly by G. D. Hanna, E. K. Jordan, and J. R. Slevin.² After some search a small patch of sandy bottom was located and by dragging back and forth across this area several times, a fair sample was secured. As might be

¹EDITOR'S NOTE. Since 1921 the California Academy of Sciences has sent three expeditions to various west Mexican localities, and a considerable number of reports has been issued and numbered serially under each. The three series have the following headings: Expedition to the Gulf of California in 1921; Expedition to Guadalupe Island in 1922; and Expedition to the Revillagigedo Islands in 1925. Since it is impossible to foresee when the final papers may be expected from these expeditions, it has been decided to discontinue the use of the headings and serial numbers. As succeeding papers are received they will be issued in the regular publications of the Academy, with sufficient explanation, however, to indicate which of the expeditions concerned contributed the material upon which the work is based. In accordance with this plan the present contribution is a direct result of the Expedition to the Revillagigedo Islands in 1925, although a minor amount of data from the Expedition to Guadalupe Island in 1922 is incorporated.—Barton Warren Evermann, *Editor*.

²See Hanna, Proc. Calif. Acad. Sci., ser. 4, vol. 15, no. 1, pp. 1-113, pls. 1-10, 7 text figs., March 30, 1926, for a general account of the expedition.

expected on such bold shores, much of the sample consisted of volcanic sand and pebbles, worn fragments of shells and other detritus. However, there was a considerable number of species of mollusca, either living or excellently preserved. These are enumerated in the present list which is believed to be justified by the meager knowledge we have heretofore possessed as to the marine life of this remarkable island. In addition, we have included a few other species collected on the shores of the island in 1922 and 1925.

Much has been written about Guadalupe, particularly in relation to the vertebrate fauna and the flora.³ The island is surrounded by water approximately 2000 fathoms in depth and is entirely volcanic, although no activity has been recorded in modern times. The surface indicates that the present form is geologically not very old. Nevertheless, many of the birds, insects, land shells and plants have been isolated so long that they have become specifically differentiated from their nearest congeners. They form a typical waif fauna and flora. No definite evidence has been brought forward to indicate that the island has ever been connected, or nearly connected, to the mainland. It is situated about 180 miles south-southwest of San Diego, California.

Not much is known of the marine life of Guadalupe other than the seals, sea lions and sea elephants. There are scattered references to the fishes and crustaceans in the literature, and probably the same is true of the algæ.

The known mollusca of the island, as represented by the Academy's collection, consists of 87 species, of which nine appear to be undescribed and 24 were previously known only from a few localities in southern California or the northern portion of the coast of Lower California. Twenty-four species show a considerable extension of the known ranges, 22 not having previously been reported south of San Diego or the Coronado Islands, and two not having previously been

³For references to the principal literature, see Hanna, Proc. Calif. Acad. Sci., ser. 4, vol. 14, no. 2, pp. 217-275, pls. 15-19, 2 text figs., September 5, 1925. An account of the land shells has been published by H. A. Pilsbry, op. cit., vol. 16, no. 7, pp. 159-203, pls. 6-12, 3 text figs., April 22, 1927.

reported north of the Gulf of California. Sixteen of the species are known to have a wide range extending from Monterey or further north to the Gulf of California or further south. Of the 40 species known to reach as far north as Monterey only 16 are reported from the Gulf of California, while of the 23 species which include the Gulf of California in their known range, 20 are known to reach as far north as Catalina Island and 10 as far north as Puget Sound. The fauna, as represented by the collection, is very similar to that of Catalina Island and the Coronado Islands since all but four of the known species have been reported from those localities.

The species in the collection are almost entirely shore or shallow water forms which either live on marine algæ or on or among the rocks to which kelp is attached. Floating masses of kelp are always present along the southern California coast and the presence of most of the species on the shores of Guadalupe Island can be accounted for most satisfactorily by the supposition that the spawn or fry has been transported by this means. This indicates a current at some time running southerly along the southern California coast and turning out to sea at an angle which carried it past Guadalupe Island. The almost complete absence of species which are characteristic of the Gulf of California or the coast of the southern portion of Lower California, indicates that there has been no similar current from the south since the time when the shores of Guadalupe Island were first able to support marine life. It is well recognized that the fauna of the coast of southern California and the neighborhood islands, containing over 1000 species, is distinctly southern in its affiliations with many species at the extreme northern end of their geographic range. This fact, taken in connection with the indicated current drift to the south, offers some proof that the prevailing ocean currents and climatic conditions along the southern California coast have changed but little during recent geological times.



LIST OF SPECIES FOUND ON GUADALUPE ISLAND

1. *Acmæa digitalis* Escholtz; Alaska to San Digo.
2. *Acmæa paleacea* Carpenter; Trinidad to Lower California.
3. *Acmæa persona* Escholtz; Aleutians to Soccoro Island.
4. *Acteocina angustior* Baker & Hanna; Gulf of California.
5. *Æsopus arestus* Dall; Magdalena Bay.
6. *Alaba jeanetta* Bartsch; San Pedro to Gulf of California.
7. *Alabina* sp.
8. *Alvania æquisculpta* Keep; Catalina to Todos Santos Bay.
9. *Alvania cosmia* Bartsch; San Pedro to San Martin Island.
10. *Alvania oldroydæ* Bartsch; San Pedro to Coronado Island. This species is present in large numbers.
11. *Alvania purpurea* Dall; Monterey to San Martin Island.
12. *Amphithalamus inclusus* Carpenter; Monterey to San Martin Island.
13. *Amphithalamus tenuis* Bartsch; Monterey to Magdalena Bay.
14. *Anachis subturrita* Carpenter; San Pedro to Todos Santos Bay.
15. *Arca solida* Broderip & Sowerby; San Pedro to Peru. This rock loving species is represented by a single valve and belongs to the dwarfed form of the southern California coast.
16. *Astræa undosus* Wood; San Pedro to Cedros Island.
17. *Barleeia californica* Bartsch; San Pedro to Abrejos Point.
18. *Billium interfossa* Carpenter; Monterey to San Diego.
19. *Bursa californica* Hinds; Monterey to Cedros Island.
20. *Cæcum californicum* Dall; Monterey to Lower California.
21. *Cadulus fusiformis* Pilsbry & Sharp; Monterey to Cape San Lucas.
22. *Calliostoma splendens* Carpenter; Monterey to San Diego.
23. *Capulus californicus* Dall; San Pedro to San Diego.
24. *Cerithiopsis* sp.
25. *Cerithiopsis oxys* Bartsch; San Pedro to Abrejos Point.
26. *Chama pellucida* Sowerby; Oregon to Chile.
27. *Circulus rossellinus* Dall; San Diego.
28. *Crenella divaricata* d'Orbigny; Santa Barbara Islands to Panama. This species was described from Cuba. Numerous valves and a few pairs seem to be the same as the west coast form said by Dall to be identical.
29. *Crepidula lingulata* Gould; Bering Sea to Panama.
30. *Cysticus politulus* Dall; Santa Barbara to Cape San Lucas.
31. *Cypræolina pyriformis* Carpenter; Sitka to Mazatlan.
32. *Diastoma* sp.
33. *Fartulum hemphilli* Bartsch; San Pedro to Abrejos Point.
34. *Fissurella volcano* Reeve; Crescent City to Panama.

35. *Glycymeris* sp.
36. *Grippina californica* Dall; San Diego. This species, previously known from the type locality only, is represented by a dozen pairs and several odd valves.
37. *Haliotis californiensis* Stearns; Santa Barbara to Guadalupe Island.
38. *Haliotis corrugata* Gray; Monterey to San Quentin Bay.
39. *Haliotis cracherodii* Leach; Coos Bay to Santa Rosalia.
40. *Haliotis fulgens* Philippi; Farallons to Gulf of California.
41. *Hipponix antiquatus* Linnæus; Crescent City to Panama.
42. *Hipponix tumens* Carpenter; Crescent City to San Diego.
43. *Hyalina californica* Tomlin; San Pedro to Puerto Libertad.
44. *Iselica fenestrata* Carpenter; Puget Sound to Gulf of California.
45. *Leptothyra paucicostata* Dall; Monterey to Coronado Islands.
46. *Liotia acuticostata* Carpenter; Catalina to Magdalena Bay.
47. *Liotia cookeana* Dall; Coronado Islands to Gulf of California.
48. *Littorina planaxis* Philippi; Puget Sound to Magdalena Bay.
49. *Lottia gigantea* Gray; Crescent City to Cedros Island.
50. *Macrocallista pannosa* Sowerby; Gulf of California to Chile. This species is represented by many valves, mostly young.
51. *Mangilia beta* Dall; Point Año Nuevo to Coronado Islands.
52. *Margarites acuticostata* Carpenter; Bodega Bay to Coronado Islands.
53. *Margarites parcipicta* Carpenter; Sitka to San Diego. Specimens of this species are the most numerous in the collection.
54. *Marginella jewettii* Carpenter; Monterey to San Diego.
55. *Metaxia diadema* Bartsch; Monterey to Point Loma.
56. *Milneria kelseyi* Dall; Monterey to Abrejos Point.
57. *Nodulus kelseyi* Bartsch; San Pedro to South Coronado Island.
58. *Norrisia norrisii* Sowerby; California to Cedros Island.
59. *Odostomia apynota* Dall & Bartsch; San Pedro to Cape San Lucas. This is one of the few abundant species found; about 300 specimens were taken.
60. *Odostomia clementina* Dall & Bartsch; San Clemente and Santa Catalina Islands.
61. *Odostomia deceptrix* Dall & Bartsch; San Hipolito and Abrejos points.
62. *Odostomia eucosmia* Dall & Bartsch; San Pedro to Abrejos Point.
63. *Odostomia navisa* Dall & Bartsch; San Pedro to Scammon Lagoon.
64. *Odostomia turricula* Dall & Bartsch; Monterey to Abrejos Point.
65. *Odostomia virginialis* Dall & Bartsch; San Pedro to Abrejos Point.
66. *Phacoides californica* Conrad; Crescent City to San Ignacio.
67. *Phasianella pulloidea* Carpenter; Puget Sound to Gulf of California.
68. *Phasianella rubilineata* Strong; San Pedro to Todos Santos Bay.
69. *Philobrya setosa* Carpenter; Forrester Island to Gulf of California.

70. *Psephidia cymata* Dall; Santa Barbara Island to Gulf of California. This species is the most numerous of the bivalves.
71. *Puncturella cooperi* Carpenter; Alaska to Santa Rosa Island.
72. *Retusa harpa* Dall; British Columbia to San Martin Island.
73. ? *Rissoella* sp.
74. *Rissoina* sp.
75. *Rissoina* sp.
76. *Rissoina* sp.
77. *Rissoina californica* Bartsch; Catalina to South Coronado Island.
78. *Rissoina cleo* Bartsch; Catalina to South Coronado Island.
79. *Seila montereyensis* Bartsch; Monterey to Todos Santos Bay.
80. *Siphonodentalium quadrifissatum* Carpenter; San Pedro to San Diego.
81. *Tegula gallina* Forbes; San Francisco to Gulf of California.
82. *Tegula regina* Stearns; San Clemente Island to Gulf of California.
83. *Teinostoma invallata* Carpenter; Monterey to Gulf of California.
84. *Teinostoma supravallata* Carpenter; Monterey to Gulf of California.
85. *Triphora pedroana* Bartsch; San Pedro to South Coronado Island.
86. *Vermiculum anellum* Morch; Monterey to Todos Santos Bay.
87. *Williamia peltoides* Carpenter; Catalina to Gulf of California.